Trusting Non-Deterministic Autonomous Agents

Completed Technology Project (2015 - 2016)

Project Introduction

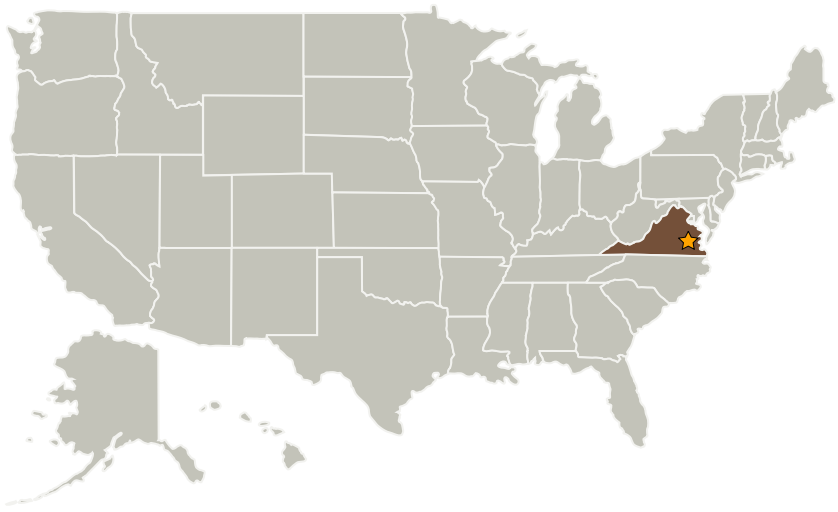
To realize the full benefit from autonomy, systems will have to react to unknown events and uncertain dynamic environments. The resulting number of behaviors is essentially infinite; thus, the system is effectively non-deterministic. This research is exploring new methods to verify and validate (V&V) non-deterministic systems and then inform the operator to foster trust and increase efficiency of the system as a whole.

To realize the full benefit from autonomy, systems will have to react to unknown events and uncertain dynamic environments. The resulting number of behaviors is essentially infinite; thus, the system is effectively non-deterministic. An operator overseeing a group of autonomous vehicles needs to understand and trust the actions of the autonomous vehicles. Achieving trust will become even more difficult and complicated if the vehicles are able to make effectively non-deterministic decisions. This research intends to tackle these problems by informing the operator of the autonomous agent's decision and aspects of its decision process to foster trust and increase efficiency of the system as a whole. This will ultimately aid in developing new methods to V&V non-deterministic systems.

Anticipated Benefits

V&V methodology for non-deterministic systems

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Innovation Fund: LaRC CIF

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Management

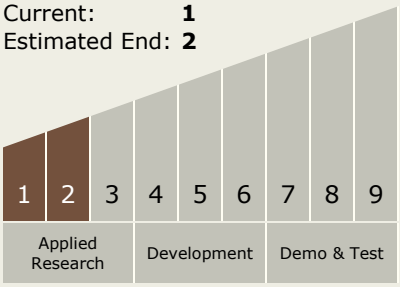
Program Director:
Michael R Lapointe

Program Manager:
Julie A Williams-byrd

Principal Investigator:
Anna C Trujillo

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **2**



Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.3 Collaboration and Interaction
    - TX10.3.4 Operational Trust Building